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The Fast Fashion Footprint: Evaluating Environmental Strain in India's Textile and Apparel Sector

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Overview of Fast Fashion and Environmental Impact

Fast fashion is notorious for its substantial carbon footprint, with the fashion industry annually emitting approximately 1.2 billion tonnes of CO2 equivalent into the atmosphere. A large portion of these emissions, around two-thirds, stems from the production of fibres used in clothing, including both synthetic fibres derived from fossil fuels and natural fibres requiring intensive farming practices. The rapid turnover of fashion trends has fostered a culture of disposability, where garments are often discarded after minimal use, contrasting sharply with past consumer habits of keeping clothing for longer periods. This shortened lifespan of clothing since 2000 has exacerbated the environmental impact of textile waste.

Beyond carbon emissions, the fashion industry contributes to environmental degradation through the depletion of non-renewable resources and the release of pollutants during various production stages. Extraction of raw materials such as water-intensive cotton and petroleum-based synthetics leads to resource depletion and habitat destruction. Furthermore, manufacturing processes involving dyeing, finishing, and garment assembly release chemicals and wastewater that pollute ecosystems, affecting air, water, and soil quality.

According to the United Nations Environment Programme (UNEP), the fashion industry accounts for approximately 2% to 8% of global carbon emissions, making it a significant contributor to climate change alongside sectors like transportation and energy.[1] This underscores the urgent need for sustainable practices and innovations within the fashion industry to mitigate its environmental impact. Efforts to reduce emissions, enhance resource efficiency, and promote circular fashion models emphasizing durability and recyclability are critical steps toward creating a more sustainable future for fashion.

Today, the textile industry, a critical component of India's economy, faces challenges due to the rapid growth of fast fashion, which is expected to increase the country's textile waste, according to experts in sustainability initiatives. The sector contributes significantly to India's industrial production (14%), gross domestic production (3%), excise revenue (8%), and export earnings (17%), while providing direct employment to over 35 million people. However, as the industry globalizes and competes in the international market, sustainable growth becomes paramount. It is essential to ensure that this growth does not come at the expense of environmental degradation. Fast fashion has transformed the apparel industry with its focus on rapid production cycles, frequent turnover of styles, and affordability. Major brands like Zara, H&M, and Forever 21 dominate this market, meeting global demand. However, the environmental consequences of fast fashion are profound. The textile industry ranks among the largest global polluters, trailing closely behind the oil and gas sectors. It significantly contributes to greenhouse gas emissions, surpassing those from international flights and shipping combined. The production methods associated with fast fashion lead to pollution, affecting air quality and generating substantial waste. The industry's overproduction of clothing results in vast amounts of textile waste annually, much of which is either dumped in landfills or burned, exacerbating environmental degradation.

Fast Fashion in India

The emergence of the fast fashion industry in India marks a significant shift in the country's fashion landscape, blending global trends with local sensibilities. Fast fashion, characterized by its rapid production cycles, affordability, and trend-driven approach, has gained immense popularity across urban centres in India, reshaping consumer behaviour and the retail sector.

Growth and Market Penetration

Fast fashion brands like Zara, H&M, and Uniqlo have rapidly expanded their presence in India over the past decade. Their entry has been facilitated by India's burgeoning middle-class population, increasing urbanization, and a youth demographic eager to embrace global fashion trends at accessible prices. These brands offer a wide range of clothing lines, from everyday basics to runway-inspired designs, catering to diverse consumer preferences.

[1] Putting the brakes on fast fashion, *available at*: https://www.unep.org/news-and-stories/story/putting-brakes-fastfashion#:~:text=The%20fashion%20industry%20produces%20between%202%20to,8%20per%20cent%20of%20global%20carbon%20emissions (last visited 17 June, 2024).

Consumer Behaviour and Changing Preferences
The rise of fast fashion in India reflects evolving consumer behaviour influenced by social media, celebrity endorsements, and a desire for constant novelty. Young Indian consumers, especially millennials and Gen Z, value fashion as a form of self-expression and social currency, driving demand for affordable yet stylish clothing. Fast fashion's ability to quickly replicate runway trends and offer them at lower prices resonates with these consumers, fueling its rapid adoption.

Impact on Traditional Textile and Garment Sectors
While fast fashion has brought modernity and global trends to Indian consumers, it has also posed challenges to traditional textile and garment sectors. The traditional artisanal practices and handloom industries, once the backbone of India's textile heritage, face competition from mass-produced fast fashion garments. This shift has raised concerns about preserving cultural heritage, supporting local craftsmanship, and promoting sustainable practices within the fashion industry. Since ancient times, the Indian textile industry has been renowned globally as one of the finest. Historically, this sector is believed to have played a pivotal role in India's prosperity, often referred to as the "golden sparrow." During ancient times, the Romans engaged in trade with India, reportedly exchanging an equivalent weight of gold coins for Indian textiles. Throughout history, during the Mughal and British eras, textile industries in cities like Dhaka, Malwa, and Banaras were esteemed for their world-class production and global exports. India utilized silk, cotton textiles, and adorned them with gold and silver linings, showcasing the country's rich tradition and craftsmanship in the past.[2]

During British rule, tariffs were enforced, Indian textiles were banned abroad, and British weavers faced physical abuse, leading to the collapse of India's small textile businesses. British factories in Manchester flooded markets with mass-produced clothes. Today, factories in Xinjiang and China have taken their place, supplying cheap, low-quality clothing to India via numerous fast-fashion brands. Leveraging technology and trend awareness, these factories are significantly impacting India's traditional textile industry, exploiting Gen Z's addiction to fast fashion and causing its decline.

Employment Opportunities and Economic Impact
The fast fashion industry in India has contributed significantly to job creation, particularly in urban areas where retail outlets and distribution networks have expanded. This growth has provided employment opportunities across the supply chain, from manufacturing and logistics to retail sales and marketing. However, concerns remain about labour conditions, wage disparity, and the long-term sustainability of employment in a rapidly changing industry.

Environmental and Ethical Considerations
Critics of fast fashion in India highlight its environmental impact, including water pollution from textile dyeing and chemical processing, as well as textile waste generated by the rapid turnover of clothing. Ethical issues such as labour exploitation, particularly in low-cost manufacturing hubs, have also come under scrutiny. Efforts towards sustainability, such as the Sustainable Apparel Coalition and initiatives like Project SU.RE, aims to promote responsible fashion practices and reduce the industry's ecological footprint.

Regulatory and Policy Challenges
Regulatory frameworks in India are evolving to address environmental concerns, labour rights, and sustainable practices within the fashion industry. Initiatives promoting ethical sourcing, transparency in supply chains, and waste management are gaining traction. However, enforcing these regulations across a diverse and decentralized industry remains a challenge, requiring collaboration between government bodies, industry stakeholders, and civil society organizations.

Environmental Impacts of Textile Production : In textile industry, fibres used are mainly of two types i.e. natural and manmade. Natural fibres are cultivated naturally and manmade fibres, marketed as synthetic fibre, are regenerated from natural resources or produced from chemicals.[3]

Cotton Cultivation: Cotton cultivation, despite its status as a natural and renewable fibre, poses significant environmental challenges due to its resource-intensive nature. India, one of the world's largest cotton producers, faces complex issues related to water usage, pesticide application, and soil health in its cotton farming practices.

[2] Fast fashion is killing traditional Indian textile industry and making Indians buy more clothes than they need *available at*: https://tfipost.com/2021/12/fast-fashion-is-killing-traditional-indian-textile-industry-and-making-indians-buy-more-clothes-than-they-need/ (last visited 4 July 2024).
[3] Konwar, M., and Boruah, R.R. "Textile Industry and Its Environmental Impacts: A Review"8(3) *Ind. J. Pure AppBiosci* (2020).

1. Water Consumption:
Cotton is a notoriously thirsty crop, requiring substantial amounts of water throughout its growth cycle. The intensive irrigation needed for cotton farming strains water resources, leading to over-extraction from aquifers and depletion of surface water bodies. This overuse contributes to environmental degradation and threatens the sustainability of water supplies for both agriculture and human consumption.[4] Textile production is believed to account for approximately 20% of global freshwater pollution due to the discharge of dyes and finishing chemicals.[5]

2. Pesticide and Fertilizer Use:
Cotton cultivation also relies heavily on agrochemical inputs, including pesticides and fertilizers. In India, where pest pressures are high and crop yields are crucial for farmer livelihoods, the use of pesticides is widespread. However, pesticide residues can contaminate soil, water sources, and food supplies, posing long-term risks to ecosystems and public health. Moreover, chemical fertilizers contribute to nutrient runoff, affecting water quality and aquatic habitats.[6]

3. Soil Health and Degradation:
The intensive cultivation practices associated with cotton production can degrade soil health over time. Continuous monoculture and the heavy use of agrochemicals deplete soil nutrients, reduce microbial diversity, and increase soil erosion. In India's cotton-growing regions, soil degradation is a growing concern, as it reduces agricultural productivity and resilience to climate variability. Addressing soil health requires adopting sustainable farming practices such as crop rotation, organic farming methods, and integrated pest management to restore soil fertility and biodiversity.[7]

4. Environmental Impact and Sustainability Challenges: The environmental impact of cotton cultivation extends beyond water use, pesticide contamination, and soil degradation. The carbon footprint associated with cotton farming includes greenhouse gas emissions from fertilizer production, machinery use, and transportation. Additionally, deforestation for expanding cotton cultivation areas can further exacerbate biodiversity loss and contribute to climate change.

In response to these challenges, sustainable cotton initiatives have emerged to promote more environmentally friendly farming practices. Efforts to promote sustainable cotton farming practices are crucial for mitigating environmental impacts and fostering a more resilient agricultural sector in India and beyond.

Synthetic Fibres: Synthetic fibres, such as polyester and nylon, have become integral to the global textile industry due to their affordability, versatility, and durability.[8] However, their production and disposal present significant environmental challenges, exacerbated by their widespread use in India.

1. Petrochemical Dependency and Energy Consumption:
Polyester and nylon are primarily derived from petrochemicals, making their production highly energy-intensive. In India, the textile sector is one of the largest consumers of energy, with synthetic fibres contributing significantly to this demand. According to a report by the World Bank, the production of synthetic fibres consumes nearly double the energy compared to natural fibres like cotton per ton of fibre produced.

2. Greenhouse Gas Emissions:
The production of synthetic fibres releases greenhouse gases (GHGs), particularly nitrous oxide, which is a potent contributor to global warming. According to data from the United Nations Environment Programme (UNEP), the textile industry, including synthetic fibre production, accounts for 10% of global carbon emissions per year. In India, the textile sector is responsible for around 5% of the country's total greenhouse gas emissions.

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[4]Zhang, Z., Huang, J., Yao, Y. *et al.* "Environmental impacts of cotton and opportunities for improvement" *Nat Rev Earth Environ* (2023).
[5] The impact of textile production and waste on the environment, *available at*: https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics (last visited 10 July 2024).

[6] Arun Sahay. " Cotton Plantations in India: The Environmental and Social Challenges" 34(3) *Yuridika* (September 2019).

[7]*Ibid.*
[8]Lewin, M., & Pearce, E. M. *Handbook of fibre chemistry* (Marcel Dekker, New York, 1998).

Climate Change Impacts:
The emissions associated with synthetic fibre production contribute to climate change, a phenomenon with far-reaching environmental and socio-economic consequences. Climate change manifests through rising global temperatures, altered weather patterns, sea-level rise, and increased frequency of extreme weather events. These changes pose risks to ecosystems, water resources, agriculture, and human health, impacting vulnerable communities disproportionately.

Air and Water Pollution:
The manufacture of synthetic fibres involves chemical processes that release pollutants into the air and water. These pollutants include volatile organic compounds (VOCs), particulate matter, and various chemical residues. In India, where environmental regulations may be less stringent compared to some developed countries, the impact of such pollution can be more pronounced, affecting local communities and ecosystems.

Waste Generation and Recycling Challenges:
Synthetic fibres are non-biodegradable, posing significant challenges for waste management. In India, the textile industry generates substantial amounts of waste, including post-consumer textile waste and manufacturing scrap. According to a study by the Central Pollution Control Board (CPCB) of India, the textile industry produces around 17-20% of the total industrial water pollution load in the country.
As the demand for textiles continues to grow globally, including in emerging markets like India, addressing these challenges is crucial for mitigating climate change, reducing pollution, and safeguarding natural resources for future generations.

Chemical Processing: Textile dyeing and finishing involve the use of a wide range of chemicals, including synthetic dyes, fixing agents, and finishing agents.[9] These chemicals often contain heavy metals, such as chromium, lead, and cadmium, as well as other compounds and other hazardous substances. It's estimated that textile dyeing is responsible for up to 20% of global industrial water pollution, with around 72 toxic chemicals commonly found in water due to dyeing processes.

Water Pollution:
According to the UN Alliance for Sustainable Fashion, the fashion industry consumes approximately 215 trillion litres of water per year across the cultivation, production and consumption phase.[10]

The discharge of untreated or poorly treated effluents containing textile dyes and chemicals significantly impacts water quality. In India, the textile sector consumes an estimated 425 billion litres of water annually for dyeing and finishing processes alone. A study by the Central Pollution Control Board (CPCB) found that the textile industry in India generates about 100 million litres of effluent per day, of which 90% is disposed of without treatment into rivers and other water sources.

The fashion industry ranks as the second-largest consumer of water. Producing one cotton shirt requires approximately 700 gallons of water, while manufacturing a pair of jeans consumes about 2,000 gallons of water.[11]

However, according to EcoWatch, "It is estimated that 70% of rivers and lakes are contaminated by the 2.5 billion gallons of wastewater produced by the textile industry."[12]

This not only leads to water pollution but is also causing the scarcity of fresh and clean water in the world.

Soil Contamination:
Soil contamination from textile chemicals primarily occurs through the disposal of sludge and solid waste from treatment plants. Studies indicate that textile sludge can contain high concentrations of heavy metals and other toxic

[9]Kant, R. "Textile dyeing industry an environmental hazard" *Natural Science* (2012).
[10] UN Alliance for Sustainable Fashion (Nairobi, 14 March 2019) ,*available at*: https://www.unep.org/news-and-stories/press-release/un-alliance-sustainable-fashion-addresses-damage-fast-fashion (accessed 22 June 2024).
[11] Fast Fashion and Its Environmental Impact

available at: https://earth.org/fast-fashions-detrimental-effect-on-the-environment/ (last visited 27 June 2024).
[12] Webber. Kathleen. "How Fast Fashion Is Killing Rivers Worldwide", *available at*: https://www.ecowatch.com/fast-fashion-riverblue-2318389169.html (last visited 1 July, 2024).

substances, posing risks to soil fertility and agricultural productivity.[13] Over the past two decades, declining garment prices have fueled a steady increase in the accumulation of inexpensive clothing, contributing to higher overall clothing consumption. As a result, last year in the UK alone, £3.5 billion was spent on Christmas party attire, leading to the disposal of 8 million items into landfills.[14]

Approximately 64% of the 32 billion garments produced yearly are in landfills. In America alone, an estimated 11.3 million tons of textile waste, equivalent to 85% of all textiles, end up in landfills yearly.[15]

Air Pollution: Air pollution from textile dyeing and finishing processes is primarily due to the emission of volatile organic compounds (VOCs) and particulate matter. These pollutants contribute to smog formation and respiratory health problems in nearby communities. In India, where textile clusters are concentrated in urban and semi-urban areas, air pollution from industrial emissions is a significant issue, affecting millions of people living in these regions.

Health Impacts:
The exposure to chemicals from textile dyeing and finishing poses serious health risks to workers and local communities. Studies have linked exposure to textile dyes and chemicals with respiratory illnesses, skin allergies, and even more severe health conditions such as cancer and neurological disorders. In India, where occupational safety standards may vary across different textile manufacturing units, workers are particularly vulnerable to these health risks due to prolonged exposure.

Case Studies: The textile industry in India has indeed been associated with significant environmental challenges and depletion. Here are a few case studies that highlight different aspects of environmental impact caused by the textile industry in India:

Chemical Pollution in Tirupur:
Tirupur, located in the state of Tamil Nadu, India, has gained prominence as the "Knitwear Capital" due to its large concentration of textile dyeing and printing units. However, the rapid growth of the textile industry in Tirupur has come with significant environmental consequences, particularly concerning water pollution.

According to a recent study, the River Noyyal, vital to Coimbatore district, and its tributary, the Chinnar, are contaminated with significant amounts of heavy metals. Water and sediment samples, along with specimens of a freshwater crab species collected from the river, showed elevated levels of heavy metals including copper, cadmium, lead, and zinc.[16] The effluents contain a cocktail of hazardous chemicals such as dyes, bleach, acids, and heavy metals, which are used in various stages of textile processing. These chemicals not only alter the water's chemical composition but also affect its pH levels, dissolved oxygen content, and overall ecological balance.

Over the years, this unchecked discharge has severely polluted local water bodies, impacting both surface water quality and groundwater resources. Farmers relying on the Noyyal River for irrigation have faced challenges due to contamination, affecting agricultural productivity and posing health risks to communities dependent on these water sources.

Energy Consumption in Ludhiana:
Ludhiana, often referred to as the "Manchester of India," is a bustling industrial city in Punjab known for its vibrant textile and garment manufacturing sector. This industry plays a crucial role in the local economy, employing thousands of people and contributing significantly to the city's industrial output.

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[13]Tunçal, T. "Management of Textile Industry Sludge for Environmental Sustainability". In: Kumar, V., Bhat, S.A., Verma, P., Kumar, S. (eds) Recent Trends in Management and Utilization of Industrial Sludge. *Springer*, Cham. (2024) *available at*: https://doi.org/10.1007/978-3-031-58456-5_2 (last visited 3 July 2024).

[14] Fast Fashion: The Second Largest Polluter in The World, *available at*: https://www.greenmatch.co.uk/blog/2016/08/fast-fashion-the-second-largest-polluter-in-the-world (last visited 2 July, 2024).

[15] 10 Concerning Fast Fashion Waste Statistics, *available at*: https://earth.org/statistics-about-fast-fashion-waste/#:~:text=The%20average%20US%20consumer%20throws%20away%2081.5lbs%20of,year%20and%20around%202%2C150%20pieces%20per%20second%20countrywide. (last visited 2 July 2024).

[16] River Noyyal, it's tributary polluted with heavy metals, says study, *available at*: https://www.thehindu.com/news/cities/Coimbatore/river-noyyal-its-tributary-polluted-with-heavy-metals-says-study/article32807599.ece (last visited 17 June, 2024).

However, the textile and garment manufacturing processes in Ludhiana are characterized by their intensive energy consumption. The reliance on fossil fuels, such as coal and natural gas, for power generation, exacerbates the industry's carbon footprint and contributes to air pollution.

The cumulative energy consumption in Ludhiana's textile industry not only contributes to greenhouse gas emissions but has been ranked the most polluted city in the country once by the World Health Organisation.[17]

Efforts are underway to mitigate the environmental impact of energy-intensive textile manufacturing in Ludhiana. Some initiatives include the adoption of energy-efficient technologies, such as energy-efficient motors, lighting systems, and heat recovery systems in factories. Additionally, there is a growing emphasis on renewable energy sources like solar power to supplement grid electricity and reduce reliance on fossil fuels.

Government policies and incentives also play a crucial role in promoting sustainable practices within the industry. Programs encouraging energy audits, promoting cleaner production techniques, and providing subsidies for renewable energy investments are helping to drive the transition towards a more sustainable and environmentally friendly textile manufacturing sector in Ludhiana.

Cotton farming in India: Cotton is an important crop in India, which is used as a raw material in many industries. However, cotton farming in India has many serious implications:

Pesticide and Chemical Use:
Cotton cultivation in India, especially for fast fashion production, often involves intensive pesticide and chemical fertilizer use. Farmers use these inputs to control pests and maximize crop yields. Cotton farming accounts for 4.7% of the world's pesticide and 10% of its insecticide sales – far higher than its comparative land use.[18]

Water Depletion: Cotton is a water-intensive crop, and its cultivation contributes to significant water stress in regions where it is grown. In states like Maharashtra and Gujarat, cotton farming relies heavily on irrigation, often leading to over-extraction of groundwater resources. This over-extraction lowers water tables, dries up rivers and lakes, and threatens the sustainability of water sources for local communities and ecosystems.By adopting ZLD technology, industries in India can achieve water self-sufficiency by significantly reducing their reliance on freshwater sources.

This approach not only helps meet operational water needs but also supports the broader goal of conserving and sustainably managing water resources.[19]

Biodiversity Loss: The expansion of cotton cultivation, driven by the demand for raw materials in the fast fashion industry, can lead to biodiversity loss. Large-scale monoculture farming practices reduce biodiversity by replacing natural habitats with single-crop fields. This loss of biodiversity impacts local ecosystems, disrupts ecological balance, and reduces resilience to pests, diseases, and climate change impacts.

Climate Change: 'When you shop for new clothes, you're probably not thinking about the climate. But making apparel creates carbon pollution, and the industry's emissions are on the rise as people buy – and discard – their clothes more frequently. The problem is made worse by the rise of fast fashion – clothes that are cheap to make and cheap to buy.'—Stephanie Manuzak[20]. This statement holds true in the case of fast fashion.

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[17]Ludhiana is India's most polluted: WHO, *available at*: https://timesofindia.indiatimes.com/home/environment/pollution/Ludhiana-is-Indias-most-polluted-WHO/articleshow/10153987.cms (last accessed 17 June, 2024).

[18]Pesticides and Crop Protection, *available at*: https://bettercotton.org/field-level-results-impact/key-sustainability-issues/pesticides-and-crop-protection-in-cotton-farming/ (last visited June 17, 2024).

[19] Navigating Water Scarcity: ZLD Impact on Transforming India's Water Treatment Landscape *available at*: https://scalebanindia.co.in/2023/05/navigating-water-scarcity-zld-impact-on-transforming-indias-water-treatment-landscape/ (last visited 3 July 2024).

[20]Carbon emissions from the fashion industry are on the rise *available at*:
https://yaleclimateconnections.org/2020/07/carbon-emissions-from-the-fashion-industry-are-on-the-rise/ (last visited 6 july, 2024).

Waste Disposal Issues in Kolkata:
In Kolkata's only landfill, over 4,000 metric tonnes of waste are deposited daily, despite the landfill reaching its capacity decades ago. However, waste generation was significantly lower in 1941 compared to today's levels, where Kolkata produces 5,000 metric tonnes of waste daily. Over 4,000 metric tonnes of waste were deposited at the Dhapa landfill daily, transforming it into a towering mound of refuse.[21] However, a report published in 2022, stated that three years from now, the mound of waste at Dhapa will disappear, as Kolkata Municipal Corporation's solid waste management department is conducting biomining and large quantities of waste has been removed from there.[22]

Deforestation of Indian forests:
The deforestation caused by the fast fashion industry in Indian forests is a critical environmental concern that warrants attention. Here's an overview of the issue:

1. Expansion of Cotton Cultivation: The fast fashion industry drives the demand for raw materials such as cotton, leading to the expansion of cotton cultivation in India. Forest areas in states like Madhya Pradesh, Maharashtra, and Karnataka have been affected by deforestation to accommodate cotton farms supplying the fast fashion sector.
2. Impact on Biodiversity: Deforestation for cotton cultivation fragments and destroys natural habitats, threatening biodiversity. Forest ecosystems are home to diverse flora and fauna, many of which are endemic and endangered. Clearing forests disrupts ecosystems, displaces wildlife, and reduces biodiversity resilience, which is crucial for maintaining ecosystem balance and adaptation to environmental changes.
3. Loss of Ecosystem Services: Forests provide essential ecosystem services such as carbon sequestration, water regulation, and soil conservation. Deforestation reduces these services, contributing to climate change through increased greenhouse gas emissions and impacting local climate patterns. It also increases soil erosion, leading to loss of fertile land and degradation of water quality in nearby water bodies.

Environmental Regulations in relation to the fast fashion industry: Indian Perspective
1. Solid Waste Management
- Solid Waste Management Rules, 2016[23]
Provides for management of solid waste, also castes duty on village panchayats etc, to provide for waste disposal facilities.
2. Water Pollution Control:
- Water (Prevention and Control of Pollution) Act, 1974[24]
Prohibits the use of wells, streams to dispose off the waste polluting water. It also keeps a check on the new industries, that can discharge sewage. Further, the act provides for penalties for contravention of the provisions.
3. Chemical Management:
- Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016[25]
This Act sets out the liabilities of the occupier of the hazardous chemical wastes, which need to be taken care of. It requires to ask for authorisation for keeping the hazardous wastes.
4. Air Quality Management:
- Air (Prevention and Control of Pollution) Act, 1981[26]
This statute prohibits the operating of any industrial plant in a polluted area without prior permission. It also penalises the contravention of the provisions of the Act.

Environment Protection Act, 1986[27]
The umbrella legislation provides a framework for environmental protection and pollution control. Under this Act, the Ministry of Environment, Forest and Climate Change (MoEFCC) issues notifications and guidelines for the textile sector. Sec (a) of the Act "environment" includes water, air and land and the inter- relationship which exists among and between water, air and land, and human beings, other living creatures, plants, micro-organism and property. The Central Government, shall have the power to take all such measures as it deems necessary or expedient for the purpose of

[21] Kolkata's Landfill Crisis *available at*: https://swachhindia.ndtv.com/kolkatas-landfill-crisis-the-citys-dependency-on-the-sole-landfill-of-dhapa-may-soon-result-in-an-unresolvable-crisis-11618/ (last visited June 17, 2024).
[22]Kolkata: Biomining to help remove Dhapa garbage mound in three years, *available at*: https://timesofindia.indiatimes.com/city/kolkata/biomining-to-help-remove-dhapa-garbage-mound-in-three-years/articleshow/93017107.cms (accessed June 18, 2024).

[23] Solid Waste Management Rules, 2016
[24]Water (Prevention and Control of Pollution) Act, 1974 (Act No. 6 of 1974).
[25]Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.
[26]Air (Prevention and Control of Pollution) Act, 1981 (Act No. 14 Of 1981).
[27] The Environment (Protection) Act, 1986, (Act 29 of 1986).

protecting and improving the quality of the environment and preventing controlling and abating environmental pollution.

The Biological Diversity Act, 2002
The objective behind this Act[28] is to conserve biological diversity and ensure the sustainable use of its components. This Act also advocates for the "fair and equitable sharing of the benefits arising out of utilization of genetic resources."[29] It acknowledges the necessity to "preserve and maintain knowledge, innovation and practices of the local communities relevant for conservation and sustainable use of bio-diversity.

National Green Tribunal Act, 2010[30]
The need for clarity and consistency is reinforced by the legislative mandate given to the NGT under the National Green Tribunal Act 2010. The preamble to the Act acknowledges that the judiciary has interpreted the right to life to include the right to healthy environment. The Tribunal has jurisdiction over a wide range of environmental issues and is required to apply the principle of sustainable development, precautionary principle, andpolluter pays principle while making decisions.[31]The NGT plays a crucial role in adjudicating environmental disputes and enforcing compliance with environmental laws. The National Green Tribunal (NGT) offers a specialized platform for victims, particularly marginalized communities, to seek justice and uphold their constitutional entitlement to a clean and healthy environment.

Sustainable Sourcing and Certification:Global Organic Textile Standard (GOTS)[32]: Certification criteria include compliance with organic fibre content requirements and adherence to strict environmental and social criteria throughout the supply chain.

Better Cotton Initiative (BCI)[33]- Promotes sustainable practices in cotton production, including reduced pesticide use, improved water management, and adherence to fair labour standards.

Some other organizations, that provide certifications for sustainable clothes according to set global standards are;

- Cradle to Cradle Certified - Determines whether a product has been made either entirely recyclable or biodegradable and developed under the lowest and most sustainable manufacturing processes.[34]
- Fairtrade - By opting for Fairtrade, individuals can make a difference through their daily choices. When a product carries the FAIRTRADE Mark, it indicates that producers and companies have adhered to globally recognized criteria that are verified independently.[35]
- The Sustainable Apparel Coalition certifies that all types of clothing items, including apparel, textiles, and footwear, are manufactured under sustainable conditions that minimize environmental harm and promote positive social impacts. The Coalition's aim: "An apparel industry that produces no unnecessary environmental harm and has a positive impact on the people and communities associated with its activities."[36]
- The Organic Content Standard (OCS) verifies that a product is made entirely from organic materials or those that have been organically grown throughout the entire manufacturing process.[37]

Legal principles in India protecting the environmental rights: Besides the legal framework, some principles have also been developed by the Indian judiciary in relation to the environment, so as to extend the protection to the natural habitat;

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[28] The Biological Diversity Act, 2002, (Act 18 of 2003).
[29]*TN GodavarmanThirumulpad vs. Union of India,* (2012) 4 SCC 362.
[30] The National Green Tribunal Act, 2010 (Act 19 of 2010).
[31]*Id*. at 60
[32] The Global Organic Textile Standard (GOTS) is a comprehensive and transparent textile processing standard. It defines worldwide recognized requirements for organic textiles, covering ecological and social criteria.
[33]About Better Cotton, *available at*: https://bettercotton.org/where-is-better-cotton-grown/better-cotton-in-india/ (last accessed 24 June 2024).
[34] What is Cradle to Cradle? Principles, Design and Certification *available at*: https://www.treehugger.com/what-is-cradle-to-cradle-5191335 (last visited 2 July 2024).
[35] What is Fairtrade? *available at*: https://www.fairtrade.net/about/what-is-fairtrade last visited 18 June, 2024).
[36]Sustainable Apparel Coalition, *available at*: https://www.patagonia.com/sustainable-apparel-coalition.html (last visited June 18, 2024).
[37] The Organic Content Standard, *available at*: https://textileexchange.org/organic-content-standard/ (last visited June 18, 2024).

1. *Precautionary Principle*: Government agencies must anticipate and address potential sources of environmental harm, placing the burden on developers to prove their actions are environmentally safe.[38]
2. *Polluter Pays* : Polluters are responsible for covering cleanup costs, compensating victims of pollution, and adhering to principles of restorative justice.[39]
3. *Public Trust Doctrine* : States act as trustees of natural resources, which are inherently meant for public use and enjoyment.[40]
4. *Sustainable Development*: Sustainable development involves ensuring that present needs are fulfilled without jeopardizing the ability of future generations to meet their own needs.[41]
5. *Inter-generational Equity*: This principle obligates current generations to safeguard natural resources for future generations. Intergenerational equity requires conserving the diversity and quality of biological resources, and of renewable resources such as forests, waters and soils.[42]
6. *Intra-generational Equity*: Ensures fairness among current generations in the distribution and impact of environmental benefits and burdens.

International Regulations: Other than the Indian regulations, there are some notable international regulations, that directly or indirectly concern the fast fashion industry. Some of which can be discussed as follows.

1. United Nations Framework Convention on Climate Change (UNFCCC)[43]
The United Nations Framework Convention on Climate Change (UNFCCC), established in 1992, is a critical international treaty aimed at addressing the global issue of climate change. Its main goal is to maintain greenhouse gas concentrations in the atmosphere at a level that prevents harmful human interference with the climate system.
2. Paris Agreement[44]
The Paris Agreement, a legally binding global treaty on climate change, was agreed upon by 196 nations at COP21 in Paris on December 12, 2015, and came into effect on November 4, 2016. Its primary objective is to restrict the rise in average global temperatures to below 2°C compared to pre-industrial levels, with a strong effort to limit the increase to 1.5°C.
3. Global Organic Textile Standard (GOTS)[45]
The Global Organic Textile Standard (GOTS) was created by prominent standard-setting bodies to establish universally recognized criteria for organic textiles. Covering all stages from raw material harvesting to environmentally and socially responsible manufacturing and labelling, GOTS-certified textiles offer consumers reliable assurance of their credibility.

Key Requirements and Criteria:

- **Organic Fibre Requirements:** GOTS requires that a textile product must contain a minimum of 95% certified organic fibres. These fibres are grown without the use of synthetic pesticides, herbicides, or genetically modified organisms (GMOs), promoting ecological balance and biodiversity conservation in textile production.
- **Prohibition of Toxic Chemicals:** The standard prohibits the use of toxic chemicals in all stages of processing organic fibres and textiles. This includes substances such as certain heavy metals, formaldehyde, aromatic solvents, and GMOs, ensuring textile products are safe for consumers and workers alike.

4. Better Cotton Initiative (BCI)[46]The Better Cotton Initiative (BCI) is a global non-profit organization that promotes sustainable practices in cotton production.

- **Mission:** BCI aims to make global cotton production better for the people who produce it, better for the environment it grows in, and better for the sector's future. It focuses on improving the environmental and social impacts of cotton cultivation worldwide.

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[38] Discussed by the court in *Vellore Citizens Welfare Forum v. Union of India* AIR 1996 SC 2715; *S Jagannath v. Union of India* AIR 1997 SC 811, 846; *A P Pollution Control Board v. Prof. M V Nayudu*, AIR 1999 SC 812.
[39] Discussed by the apex court in *Indian Council for Enviro-Legal Action v. Union of India* (Bichhri case) AIR 1996 SC 1446.
[40] *M. C. Mehta v. Union of India*, (2001) 4 SCC 577; *In re, Amarnath Shrine*, (2013) 3 SCC 247.
[41] Derived from Stockholm Declaration, 1972, discussed in plethora of cases by the Supreme Court.
[42] Armin Rosencranz, Shyam Divan and Mathal L. Noble, *Environmental Law and Policy in India*, 60 (1991), K. Guruprasad Rao vs State of Karnataka AIR 2013 8 SCC 418
[43] United Nations Framework Convention on Climate Change ,*available at*: https://unfccc.int/resource/docs/convkp/conveng.pdf (last visited 4 July 2024).
[44] The Paris agreement, *available at*: https://unfccc.int/process-and-meetings/the-paris-agreement (last visited 24 June, 2024).
[45] Global Organic Textile Standard *available at*: https://global-standard.org/ (last visited 24 June, 2024).
[46] *Id*. at 58.

- **Principles:** BCI promotes measurable improvements in key environmental and social impacts of cotton farming. This includes reducing the use of pesticides and synthetic fertilizers, promoting efficient water use, and improving working conditions for cotton farmers and workers.

5. ISO Standards[47]

ISO standards are globally accepted guidelines devised by experts to outline optimal practices for various activities, from product manufacturing to service delivery and material supply. These standards encapsulate the collective knowledge of specialists who understand the requirements of their respective fields, including manufacturers, consumers, regulators, and industry associations. They serve as authoritative formulas for achieving efficiency, quality, and consistency in diverse processes and industries worldwide.[48]

Relevant ISO Standards:

- **ISO 14001 (Environmental Management Systems):** Provides guidelines for organizations to establish and maintain an environmental management system.
- **ISO 26000 (Social Responsibility):** Covers guidelines for organizations on social responsibility, including labour practices, human rights, and environmental stewardship.
- **Application in Fast Fashion:Environmental Management:** ISO 14001 assists fast fashion companies in implementing strategies to reduce environmental impacts, such as energy and water consumption, waste reduction, and pollution prevention. It promotes continuous improvement and accountability in environmental performance.
- **Social Responsibility:** ISO 26000 guides organizations in ensuring fair treatment of workers, adherence to labour standards, and ethical business practices throughout the supply chain. It helps enhance transparency and trust with stakeholders, including consumers and investors.

6. Transparency and Disclosure Initiatives

Transparency and disclosure initiatives in the fashion industry aim to enhance accountability and promote sustainable practices.

Key Initiatives:

- **Fashion Transparency Index:** Assesses brands' transparency in their supply chains, including practices related to labour conditions, environmental impact, and supply chain traceability. It encourages brands to disclose information openly to stakeholders and consumers.
- **Sustainable Apparel Coalition's Higg Index:** Provides metrics and tools for measuring environmental and social impacts across the apparel and footwear supply chain. It helps brands and retailers assess their sustainability performance and identify areas for improvement.

7. Sustainable Development Goals (SDGs)[49]

The 2030 Agenda for Sustainable Development, adopted unanimously by all member states of the United Nations in 2015, presents a shared vision for global peace and prosperity. Thegoals emphasize the simultaneous pursuit of poverty eradication, enhanced health and education systems, reduced inequality, and sustainable economic growth.

Relevant Goals:

- **Goal 12 (Responsible Consumption and Production):** Promotes sustainable practices throughout production and consumption cycles, including reducing waste generation, improving resource efficiency, and adopting sustainable practices in supply chains.
- **Goal 13 (Climate Action):** Urges immediate and effective action to combat climate change and its impacts, including integrating climate change measures into national policies and promoting education and awareness on climate change mitigation.

3.7 Recent Developments

Recent regulatory developments highlight ongoing efforts to address sustainability in the fashion industry globally:

[47]ISO standards, *available at*: https://www.iso.org/standards.html (last visited June 24, 2024).

[48]ISO standards are **internationally agreed standards**that cover a wide range of topics, including environmental management standards to help reduce environmental impacts, reduce waste and be more sustainable.

[49] Sustainable Development Goals, *available at*: https://sdgs.un.org/goals (last visited 24 June, 2024).

- **European Union (EU)[50]:** Introduced the Ecodesign for Sustainable Products Regulation (ESPR) to improve product circularity and sustainability. It sets standards for single-fibre clothes, promotes recyclability through labeling, and aims to reduce environmental impacts across the fashion sector.
- **United States:** Enacted the Fashioning Accountability and Building Real Institutional Change Act (FABRIC Act), the first federal legislation aimed at improving labour rights for garment workers and supporting the reshoring of American garment manufacturing. Some states, like California, have also passed bills to enhance labour protections and promote ethical practices in the garment industry.

In summary, there is a significant impact of fast fashion on the environment, in India. The penetration of different market forces like H&M and Zara led to the development of fast fashion in the country, accelerated by consumer's choices and attitudes. The fast fashion is killing the environment daily, whether by GHG emissions, water pollution, resource depletion or by any other causes.

[50]Ecodesign for Sustainable Products Regulation

Available at: https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/sustainable-products/ecodesign-sustainable-products-regulation_en#Ecodesign%20from%20An%20International%20Perspective (last visited 4 July 2024).